designed for and intended for, even when the gantry mounted machine is fitted with a multi-leaf collimator.

Col. 7 lines 66 to col. 8 lines 33 discusses the problem of verifying the correct operation of the tomotherapy machine's shutter mechanism from detector measurements of rays that are detected after passing through the patient. This section does not pertain to the calculation of the dose to the patient from the post detector measurements as stated in the Detailed Action at the bottom of page 2. In column 9 lines 66 through column 19 line 1 it is stated that the "dose delivered to the patient 17 is computed using the measured fluence determined at process block 86". At process block 86 the fluence is computed using the signals detected after transversing the patient (col. 9 line 60-64, col. 7 lines 37 – col. 9 lines 33) and Figure 4. Olivera discloses a process different from our claim and for a different type of radiation machine. The tomotherapy machine described by Olivera has shutters that attenuate the beam along a fan line geometry. The process of irradiation is repeated as the patient is translated through the patient in order to irradiate a volume with any depth along the long axis of the body (head to feet). The components of the tomotherapy machine are mounted on a circular structure that rotates. The patient is translated through the center hole of that circle. A gantry mounted radiotherapy machine has the radiation source mounted at the end of a long gantry, but which can also rotate in a circle around the patient. But there is no circular structure that the patient must be translated through and the patient is generally not translated during treatment. There may or may not be a counter-weight at the other end which can intersect the beam. Some machines do have imaging devices mounted that allow for x-ray pictures to be taken of the treatment field. Such an imaging device is generally different from the detector array used in the tomotherapy machine. Our process verifies the dose to the patient from measurement before the patient, theirs afterwards. Their process is dictated by the design of the tomotherapy machine, ours by the design of the gantry mounted machine.

In Detailed Action page 3, item 4, it is stated that "Olivera discloses that verification process can be implemented without the patient present (col. 8, lines 41-46, col. 9, lines 23-43)". However, it is clear from these references that the patient is being replaced with a phantom, not the patient or phantom eliminated altogether. The same process is performed using a phantom and measuring the exit dose from the phantom is used to verify the correct operation of the machine.

The reviewer is comparing our claim to that developed for control of the tomotherapy machine. Our claim concerns a method for verifying the correct treatment of patients irradiated with gantry mounted radiation machines. The detectors that are used on the tomotherapy machine for measuring the exit dose and used to ultimately verify the correct operation of the machine and ultimately the correct dose to the patient is a different process from measuring the entrance fluence directly as is done with our process. Measuring the exit dose on a fan line circular array of detectors on a tomotherapy machine is different from measuring the entrance field for a gantry mounted machine. Further, the process developed by Olivera for the tomotherapy machine in general could not be applied to a gantry mounted machine without significant changes to the design of the gantry mounted machine and to the process employed for verification.

One would essentially be reverse engineering a gantry machine to make it into a tomotherapy machine.

In Detailed Action page 3 item (7), the reviewer suggest more detail is needed for the dose algorithm employed. We believe that we have described the algorithm in words in sufficient detail for any practitioner of the art to understand the process. The radiation field is subdivided into small pixels known as pencils. The calculation of dose to a patient using pencil models is well known to the radiation therapy community. The deviation in our process is that the weight of each pencil comes from the measured field fluence rather than from a model of the radiation source. There is no further detail to that statement. Further, the details of any particular implementation of a pencil beam algorithm can differ in any embodiment of the invented process, as long as the pencils are weighted by the measured fluence. It is the use of the measured fluence as stated that produces the verification process.

Conclusion

For all of the above reasons, applicant submits that the claim is now in proper form, and that the claim defines patentably over the prior art. Therefore he submits that this application is now in condition for allowance, which action is respectfully solicited.

Respectfully submitted:

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